Ohio Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Scott J. Nally, Director

January 28, 2011

Issuance of A Limited Environmental Review
To All Interested Citizens, Organizations, and
Government Agencies

City of Cincinnati
Hamilton County
Green Roof Loan Program of Cincinnati, Ohio
Loan Number CS 390255-0004

The purpose of this notice is to advise the public that Ohio EPA has reviewed the referenced project and finds neither a Supplemental Study (SS) nor an Environmental Assessment (EA) is required to implement the project as discussed in the attached Limited Environmental Review (LER). Consequently, a Finding of No Significant Impact is being issued for this project.

The Water Pollution Control Loan Fund program requires the inclusion of environmental factors in the decision-making process for project approval. Ohio EPA has done this by incorporating a detailed analysis of the environmental effects of the proposed action in its review and approval process. Environmental information was developed as part of the facilities plan, as well as through the facilities plan review process. A subsequent review by this Agency has found that the proposed action does not require the preparation of either an EA or an SS.

Our environmental review concluded that because the proposed project is limited in scope and meets all applicable criteria, a LER is warranted. Specifically:

- The proposed project will have no significant adverse environmental effect, nor will it adversely affect any specific resource type.
- It will not require extensive general or specific direct impact mitigation.
- It will not affect current design flow value, the existing service area, or wastewater influent characteristics.
- It is of reasonable cost.
- It is not controversial.
- It will not create a new or relocate an existing sanitary discharge to surface or ground water.

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- It will not result in an increase in the volume of discharge or loading of pollutants to receiving water.

The LER presents additional information on the proposed project, costs and the basis for our decision. Further information can be obtained by calling or writing the contact person listed on the back of the LER.

Upon issuance of this determination, loan award may proceed without being subject to further environmental review or public comment, unless information is provided which determines that environmental conditions on the proposed project have changed significantly.

Sincerely,

Gregory H. Smith, Chief
Division of Environmental &
Financial Assistance

LLER

# LIMITED ENVIRONMENTAL REVIEW

For

# GREEN ROOF LOAN PROGRAM OF CINCINNATI, OHIO

City of Cincinnati
Hamilton County
WPCLF Loan Number CS 39255-0004

Applicant: City of Cincinnati
Milton Dohoney, Jr.
City Manager, City of Cincinnati
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Cincinnati, OH 45202

## Summary of Need

The City of Cincinnati Office of Environmental Quality (OEQ) and the Metropolitan Sewer District of Greater Cincinnati (MSD) propose to establish a low-interest loan program that will provide property owners with financial incentives to install vegetated ("green") roofs and accompanying on-ground storm water best management practices (BMPs) on new and existing buildings within the service area of MSD. The purpose of this program is to reduce the wet weather activation of combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs) into Cincinnati area streams by reducing storm water runoff. This will in turn help improve local stream water quality by reducing pollutant loadings from CSOs and SSOs. The green roof component of the program will also have other benefits including the reduction of the urban "heat island" effect caused by heat radiating from rooftops, reduction of energy cost to heat and cool individual buildings, and reduction of pollutant loads in roof discharges.

The MSD service area covers most of Hamilton County in southwestern Ohio (Figure 1). It is located in the Ohio River Watershed and includes nineteen watersheds (Figure 2). Cincinnati is the largest municipality served by MSD.

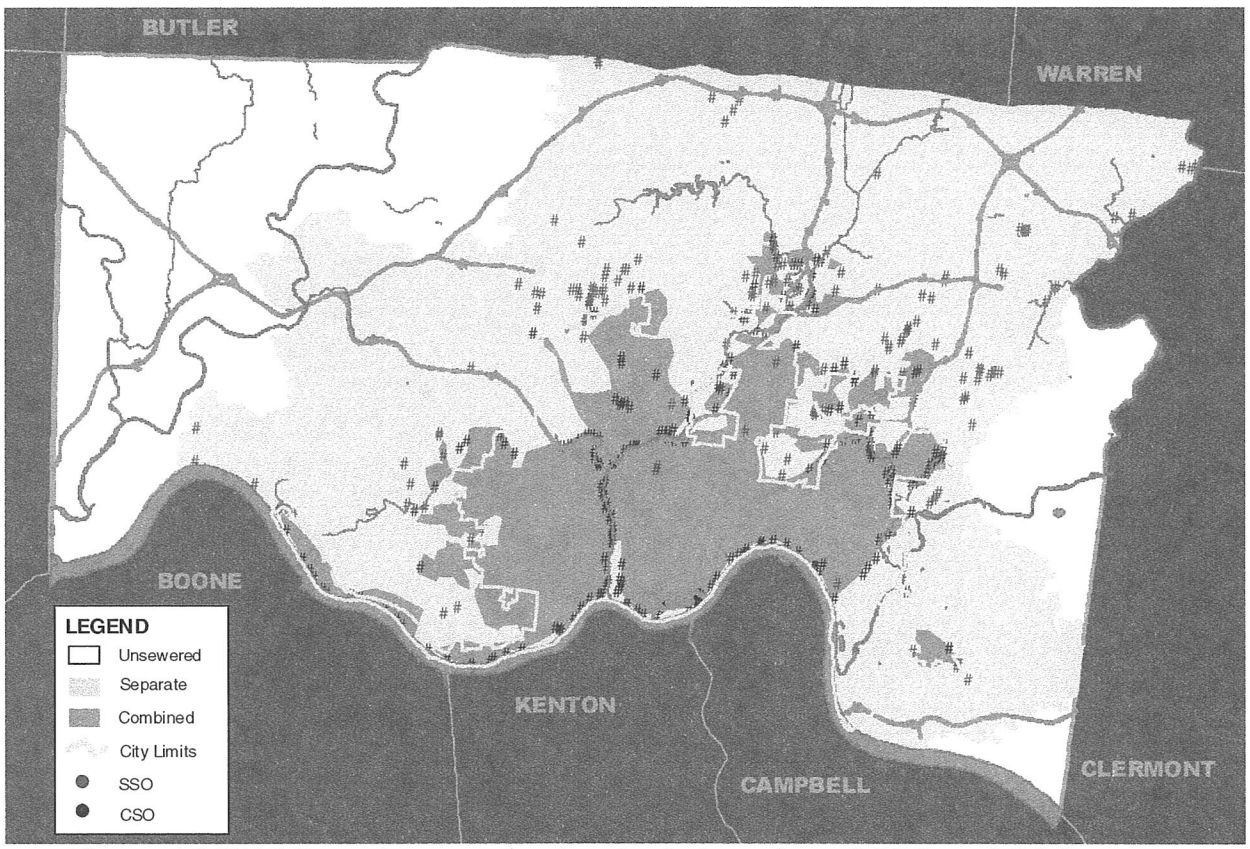


Figure 1 MSDGC service area (entire shaded area), and SSO and CSO areas.

MSD owns and operates a network of combined sewers (pipes that carry both storm water runoff and sewage) and sanitary sewers (those carrying only sewage). Combined

sewers are an outdated design, no longer permitted, in which raw sewage and storm water runoff from impervious surfaces are collected in the same pipe. Excess wet weather flows of mixed raw sewage and storm water are discharged to local waterways through CSOs. While runoff from all impervious surfaces contributes to CSO activation, in densely-developed areas such as the Cincinnati core, collectively rooftops are major contributors to high peak combined sewer flows that activate CSOs.

Sanitary sewers are designed to convey only domestic and industrial wastewater. In older sanitary systems, rainfall-derived infiltration and inflow (I/I), which enters through pipe defects and direct connections to private inflow sources, can raise flows beyond hydraulic capacity, activating SSOs. MSD's sanitary sewers have approximately 130 SSOs, all but a dozen of which are outside Cincinnati.

MSD's combined sewers have approximately 230 CSOs, 212 of which are in Cincinnati. In a typical year, approximately 25 billion gallons of inflow enter MSD's combined and sanitary systems, in addition to 75 billion gallons of sewage. SSOs discharge approximately 100 million gallons of untreated sewage to the local waterways annually; CSOs discharge approximately 14 billion gallons annually. The overflow receiving waters are Mill Creek, the Lower Little Miami River, the Ohio River and their tributaries (Figure 2).

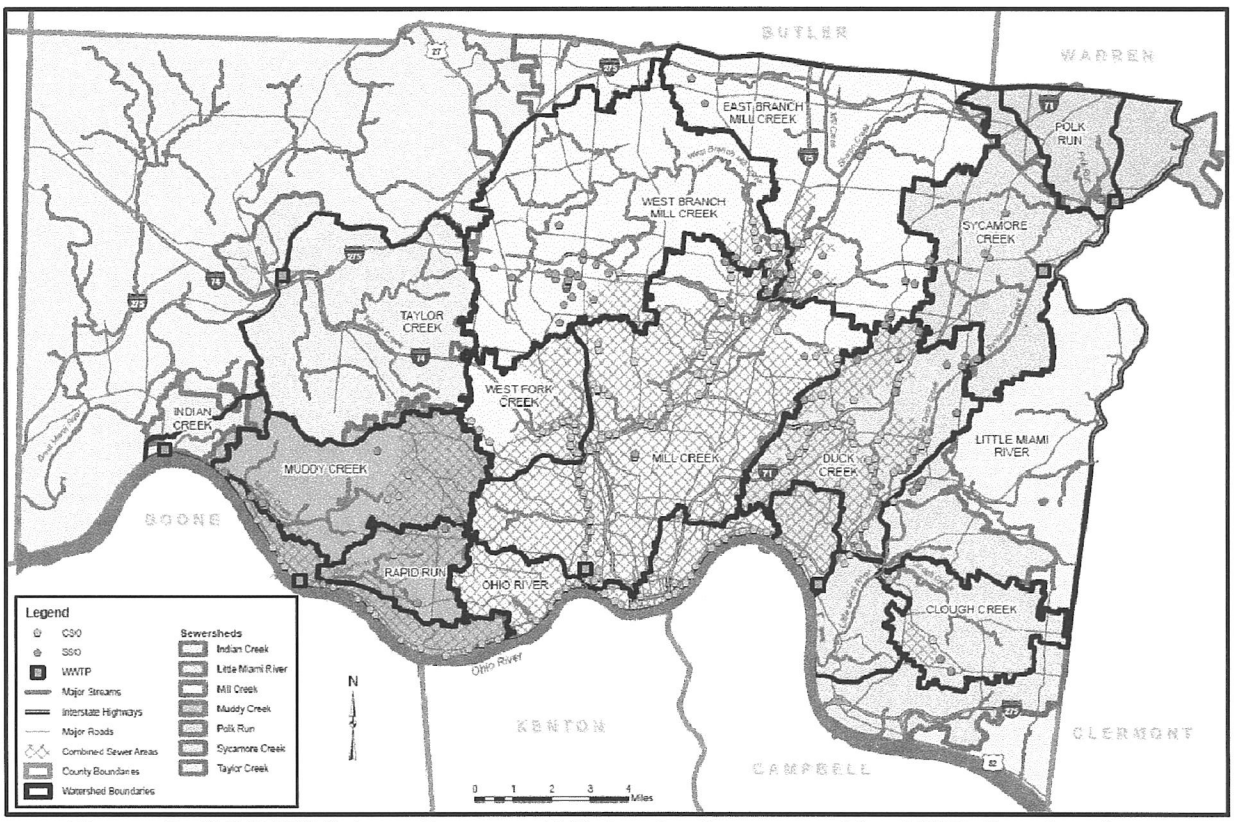

Figure 2: CSO/SSO Locations and Watersheds covered by MSD Service Area

Of eleven watersheds that are covered by Cincinnati, the Mill Creek watershed is the most impacted by CSOs. Mill Creek originates in southern Butler County and flows through the East Branch Mill Creek and Mill Creek watersheds to the Ohio River. It receives wet weather flows from 96 CSOs, 59 of which are in the Mill Creek watershed along with five active SSOs. Approximately 7.1 billion gallons of excess wet weather flow, or about half of the 14 billion-gallon annual CSO overflow volume, discharge from the Mill Creek watershed CSOs and SSOs annually. Excess wet weather flow also leads to frequent water in basement complaints.

Mill Creek from its headwaters to its mouth is adversely affected by CSOs, industrial point sources, landfills and contaminated sediments. From Center Hill Road (river mile 7.9) to the mouth, Mill Creek is legally designated a modified warm water habitat. This means it is so severely impacted that it has no potential to support a balanced, integrated, adaptive community of warm water organisms. Upstream from river mile 7.9 Mill Creek is designated a warm water habitat, which means it has the potential to support a balanced, integrated, adaptive warm water aquatic community. However, the abovementioned impairment sources prevent upper Mill Creek from attaining its warm water habitat designation.

CSOs are considered severe impairment sources in the Mill Creek watershed. Streams in the watershed fail to meet bacterial standards during dry or wet weather, with CSOs the main contributors of wet weather bacterial loading. Lower Mill Creek has the highest concentration of CSOs.

## The CSO Long Term Control Plan and Green Cincinnati Plan

In 2003, Hamilton County entered into a Consent Decree with the US EPA, Ohio EPA and the Ohio River Sanitation Commission to implement plans for controlling sewer system overflows to surface water, streets and basements. As part of the Consent Decree, the county developed a Wet Weather Improvement Program, which includes a CSO Long-Term Control Plan (LTCP, the 2003 update), a Sanitary Sewer Capacity Assurance Program, a Water-in-Basement Program and a Sewer Rehabilitation Program.

The LTCP recommends high rate treatment, wet weather storage basins, combined sewer separation, sewer rehabilitation to reduce CSO discharges. In general, such hard infrastructure will cost-effectively control a high percentage of the CSO discharges, beyond which there is little of any additional level of control in return for incremental capital expenditure. In light of the high monetary cost of hard infrastructure, Cincinnati is seeking to incorporate infiltration aids such as rain gardens, green roofs, and bioswales to reduce storm runoff at its source, thus reducing hard infrastructure requirements. Green infrastructure is part of the LTCP. Pilot projects are planned or underway, opportunities are being taken to include green infrastructure at the project level, and a system-wide green infrastructure program measures is being developed.

While the LTCP will employ a wide range of green infrastructure types, green roofs and on-ground storm water BMPs done in conjunction with green roofs are the focus of the program that is the subject of this Limited Environmental Review. Green roofs are structural roof components that filter, detain and absorb rain water. They are constructed of a lightweight soil medium underlain by a drainage layer, a high quality impermeable membrane to protect the building structure, and structural support. The soil is planted with specialized mixes of plants that can thrive under harsh, dry, hot rooftop conditions, and can stand short periods of inundation.

Green roofs are the focus of this program because of their wide range of benefits other than their role in storm water management, as discussed in the Green Cincinnati Plan (2008). The dense concentration of dark colored pavement and rooftops absorb and release enough heat to generate a "heat island" effect in which the city core is hotter than the surrounding area. Warmer core temperatures reduce air quality over the city as the heat facilitates reactions among pollutants that generate ozone. Warmer core temperatures also lead to increased use of air conditioning, which in turn contributes to the generation of greenhouse gases. Over time, a growing number of vegetated roofs will help control these effects and reduce energy costs for individual buildings.

On-ground storm water BMPs would work in conjunction with the green roofs, and would only be considered for funding as an adjunct to the green roof.

**MSDGC/OEQ Green Roofs Program Description**

Program Components: The Green Roofs Program will allow interested property owners to voluntarily apply for the design and installation of green roofs and accompanying storm water BMPs with funding made available by the Ohio EPA – Division of Environmental and Financial Assistance at below-market interest rates. A promotional campaign will be conducted, especially in the target areas. Interested property owners will complete a Green Roof Loan Program application and set of plans that meet the eligibility criteria, minimum design standards and terms and conditions outlined in the 2009 *Green Roof Loan Program, Cincinnati, Ohio*, (the Plan). OEQ will review the applications; those that meet the criteria will be awarded a Certificate of Qualification. Property owners will submit their Certificates to lending institutions that have agreements with Ohio EPA to make loans available through a Linked Deposit program (termed "Participating Banks"). Participating banks will screen applicants for creditworthiness according to their normal criteria. Those who receive loans will construct the green roofs with oversight by MSD, maintain them and report on post-installation energy consumption.

Goals: The primary programmatic goal is 80 percent reduction in roof discharge from 1 inch rainfall within two years where green roofs are installed. Where ancillary on-ground storm water BMPs are utilized, storm water runoff from the site will be reduced as well. The secondary goal of the Green Roof Program is to help meet the goals of the Green Cincinnati Plan, which is Cincinnati's climate protection plan. These include improving

the energy efficiency of buildings, reducing the heat island effect and reducing greenhouse gas emissions.

Applicability: The program will apply to new and existing buildings in the MSD service area. However, within the service area, the focus will be on the areas most impacted by CSOs and SSOs; specifically, the Mill Creek watershed and drainage areas within it that have known sewer capacity problems. Although education and outreach efforts will cover the MSD service area, the program will be most heavily promoted in the targeted overflow zones.

Eligibility: Eligible proposals will be green roofs and on-ground backup BMPs such as cisterns or rain gardens to capture flows that exceed the capacity of the green roof. Ineligible projects will include detention and retention basins and other at-grade practices when they are the only solution proposed and are not designed in conjunction with a green roof.

Further, eligibility will be restricted to existing or new buildings that can be verified in writing by a licensed third party, such as a structural engineer or an architect, to be stable enough and the roof durable enough to bear the weight of a green roof.

Eligible costs will include the design and installation of the green roof and ancillary on-ground practices, structural upgrades to support increased loads, all components of the green roof system and ancillary on-ground practices, irrigation systems if necessary for specific green roofs, maintenance contract or operation and maintenance for up to five years, roof access for maintenance (if not already present), permitting costs, warranty costs for green roofs, and permanent educational signage on site. Costs to correct roof failures that are not covered under warranties will be eligible provided that they are the result of lack of experience with green roofs and on-ground practices as new technologies, and not the result of gross lack of maintenance.

Ineligible costs will include construction or repair of building components that are not related to the green roof or its on-ground backup practices and construction or repair of components that are not related to storm water retention practices.

Implementation: The program will be pursued under a Memorandum of Understanding (MOU) between OEQ, MSD and Ohio EPA. The MOU will establish the responsibilities of the parties to implement the Green Roof Loan Program and authorizes funding through the Linked Deposit Loan Program of the Water Pollution Control Loan Fund (WPCLF). The linked deposit mechanism works by allowing participating lenders to make loans to green roof applicants at a reduced interest rate and secure the purchase of a certificate of deposit from Ohio EPA at a similarly-reduced interest rate (but no less than one percent). This allows the state to partner with private lenders, which can screen applicants' creditworthiness. Only banks that have entered into a Participating Bank Agreements with Ohio EPA may lend through the Linked Deposit Loan Program.

The green roof program will start on the date of execution of the MOU by all parties and operate for five years thereafter. At that time the parties will evaluate the program for effectiveness, decide whether to renew the program and MOU, and, if it is decided to extend the program for another time period, negotiate changes to it, if any. MSD and OEQ estimate the funding need at approximately $5,000,000 for the period of the MOU.

Monitoring and Reporting: OEQ will monitor the square footage of green roof installed. MSD will estimate the rainfall volume that is retained by green roofs by monitoring the rainfall onto and the discharge from individual completed green roofs, correcting for extraneous water sources such as air conditioners and neighboring roofs. This will quantify the volume of water each green roof is removing from the CSO system. Additionally, property owners will document their monthly pre- and post-installation energy usage and costs to estimate reductions in energy consumption.

Environmental Reviews: Because of the program's focus on the Mill Creek watershed, it is anticipated that most applications will involve properties that are extensively paved (e.g., buildings with surrounding parking lots, sidewalks, etc.). The installation of on-ground backup practices such as cisterns or rain barrels on paved surfaces will have no potential adverse environmental effect, although the installation of the roofs themselves could affect historic buildings. The Cincinnati Department of City Planning, Historic Conservation Office will follow its procedures for identifying and protecting historic properties. In addition, the Historic Conservation Office will check whether properties are located in flood zones, coastal barrier zones and airport runway protection zones and take their customary steps to reduce impacts.

A few applications may come in from the outlying watersheds of the MSD service area, where unpaved surfaces are more common. OEQ will refer plans that include the placement of rain gardens, bioswales and other on-ground backup practices in undeveloped areas to Ohio EPA for a review of impacts to endangered species, wetlands, archaeological features or other environmental features in the area of disturbance.

## Conclusion

The proposed Green Roof Loan Program constitutes a project type (i.e., it is the installation of vegetated roofs on existing and new buildings as a form of nonpoint source storm water control) that qualifies for a Limited Environmental Review. Specifically, it meets the following criteria:

- It will have no significant environmental effects and require no extensive specific impact mitigation, because of the limited scope of construction activities.

- It will have no effect on high value natural features since none exist on the rooftops, or are likely to occur in the immediate areas where most on-ground practices might be installed. Review of potential impacts and mitigation of

- adverse effects in undisturbed areas will be agreed upon prior to the award of a Certificate of Qualification.

- It is of reasonable cost.

- It is not controversial. Public participation was incorporated into the development of the LTCP. Advance publicity for the program has received positive responses from the public.

- It does not involve a new or relocated discharge to surface or ground water, involve any increase in the volume of discharge or loading of pollutants from an existing source or new facilities, or provide capacity to serve a design population substantially greater (30 percent) than the current population.

The project will have benefits in terms of CSO reduction, surface water quality improvement, energy savings, reduction of heat island effect and greenhouse gas reduction. It will have no significant adverse short-term or long-term impacts to streams, wetlands, floodplains, archaeological or historical properties, endangered species, aquatic or terrestrial habitat, scenic rivers, state or federal wildlife areas, or air quality.

For further information, please contact:

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